

Success of an Educational Intervention on Maternal/Newborn Nurses' Breastfeeding Knowledge and Attitudes

Laura W. Bernaix, Margaret L. Beaman, Cynthia A. Schmidt, Judith Komives Harris, and Linda Mitchell Miller

Correspondence

Laura W. Bernaix, PhD, RN,
Primary Care & Health
Systems Nursing, School of
Nursing, Southern Illinois
University Edwardsville,
Box 1066, Edwardsville,
IL 62062.
lbermai@siue.edu

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ABSTRACT

Objective: To test the effect of a breastfeeding educational program for improving breastfeeding knowledge, attitudes, and beliefs of maternal/newborn nurses, and to improve their intentions to provide breastfeeding support to new mothers.

Design: Quasi-experimental, pretest/posttest design.

Setting: Maternity units of 13 hospitals located in midwestern and east coast states.

Participants: Nine experimental and three control hospital sites resulted in a convenience sample size of 240 registered nurses (RNs); 206 RNs in the experimental sites and 34 RNs in the control sites.

Methods: Participation in the experimental groups involved the completion of two questionnaires upon study entry and then again after completion of a self-study module. Participants in the control groups completed the two questionnaires twice with a 4- to 6-week interval between them without access to the self-study module.

Main Outcome Measures: Nurses' breastfeeding knowledge, attitudes, beliefs, and intentions to support postpartum mothers who are breastfeeding.

Results: Findings suggest that this educational strategy was effective in improving maternal/newborn nurses' breastfeeding knowledge, attitudes, and beliefs, and intentions to support breastfeeding mothers.

Conclusion: This self-paced, study module, which is guided by an on-site, trained staff member, may be a cost-effective strategy for improving nurses' breastfeeding knowledge and support to new breastfeeding mothers. Nurses may find this type of teaching modality to be less intimidating than a structured classroom setting, and more desirable for their busy schedules.

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Laura W. Bernaix, PhD, RN, is a professor and department chair, Primary Care & Health Systems Nursing, School of Nursing, Southern Illinois University Edwardsville, Edwardsville, IL.

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Over the last several decades, advocates for breastfeeding have worked diligently to improve the breastfeeding initiation and duration rates in the United States. Promotional efforts by key professional organizations and experts have tried to convey to the general public that there is a wealth of evidence demonstrating that breast milk is the optimal food for infants and that breastfeeding is associated with decreased infant and maternal morbidity and mortality. Consequently, breastfeeding initiation rates have increased; as of 2004, 74% of all women were breastfeeding their infants at time of hospital discharge, which represents an increase of approximately 4% since 2000 (Centers for Disease Control and Prevention [CDC], 2008). Although this trend is encouraging and very close to the Healthy People 2010 goal of having 75% of all

mothers breastfeeding at time of postpartum hospital discharge, the trend for duration rates is not as positive.

The duration rates of breastfeeding, through 6 months into 1-year postbirth, continue to reflect a steep decline beyond the first few weeks. According to the National Immunization Survey, conducted in 2005 by the CDC, the percentage of U.S. children receiving any breast milk through 6 months was 43% and only 23% through 1 year. Exclusive breastfeeding (nothing but breast milk) was reported to only reach 33% at 3 months and 14% at 6 months. Further, much of the drop-off in breastfeeding was noted to occur within 2 weeks postdelivery. Although there are a myriad of inter-related factors that influence the initiation and

continuation of breastfeeding, the quality of the breastfeeding instruction and support the mother receives during the immediate hospital postpartum period is an important influencing factor. Unfortunately, new mothers often receive inconsistent and/or inaccurate breastfeeding support while in the hospital. According to the first national Maternity Practices in Infant Nutrition and Care (mPINC) Survey, conducted by the CDC in 2007, a significant number of facilities provide maternity care that is not evidence based and potentially detrimental to breastfeeding (CDC, 2008). Several maternal practices are known to promote breastfeeding success: (a) skin-to-skin contact between the mother and her infant immediately after birth; (b) early, frequent, and exclusive breastfeeding during the hospital stay; (c) rooming-in; (d) instruction and assistance provided by the hospital staff; and (e) providing the mother with postdischarge resources and follow-up. In the CDC study, none of these practices was consistently reported across all sampled facilities ($N = 2,687$). For instance, though 88% of the facilities reported that they taught breastfeeding technique to their postpartum mothers, 65% of these same facilities told their patients to limit suckling time at each breastfeeding, and 45% and 24%, respectively, gave pacifiers and supplements to more than one half of the healthy, full-term breastfed infants born in their facility (CDC, 2008).

The CDC study supports reports from several smaller studies. In Spears' (2004) study of 151 maternal/newborn nurses, 41% reported that they limited the infants' time at the breast. Gagnon, Leduc, Waghorn, Yang, and Platt (2005) found that 47.9% of the healthy, term infants in their study received formula supplementation in the hospital, with the median age for supplementation occurring at 8.4 hours. Other studies have reported the similar routine practice of in-hospital formula supplementation (Labarere, Castell, Fourny, Durand, & Pons, 2003; Semenic, Loiselle, & Gottlieb, 2008).

In a study analyzing the effects of specific hospital practices on breastfeeding duration, five practices were identified to be positively related to breastfeeding duration: breastfeeding within the first hour after birth, rooming-in, exclusive breastfeeding, no pacifier use, and receipt of telephone breastfeeding "hotline" for postdischarge use (Murray, Ricketts, & Dellaport, 2007). Of the 2,172 sampled women, only one in five women (18.7%) experienced all of these practices. Breastfeeding rates declined more slowly over time when more of these hospital practices were present: 89% at 4 weeks, 80% at 9 weeks, 70% at 13 weeks, and

Unfortunately, still today, new mothers often receive inconsistent and/or inaccurate breastfeeding support while in the hospital.

63% at 17 weeks. Chien, Tai, Chu, Ko, and Chiu (2007) reported a strong positive association between the number of 10-step practices of the WHO/UNICEF Baby Friendly Hospital initiative and the prevalence of any breastfeeding (partial or exclusive) at three different time points (during the hospital and at 1 and 3 months postpartum).

Repeatedly, the literature also illustrates that nurses vary in their ability to provide breastfeeding support to new mothers. Many nurses lack knowledge about practices that promote breastfeeding initiation and duration, and/or have negative or indifferent attitudes about breastfeeding. Bernaix (2000) found that nurses' ability to provide breastfeeding support was influenced by their attitudes and knowledge. Spears' (2004) sample of 151 nurses had poor knowledge about the nutritional value of breast milk; 41.9% believed breast milk and formula were comparable.

An apparent lack of agreement between what is and is not "breastfeeding support" was explored in a study by Nelson (2007); interviews of 12 maternal/newborn nurses were conducted to determine the significance and meaning of the elements of inconsistent professional breastfeeding support. Nurses recognized that inconsistencies still remain and are often a function of some nurses' failure to "buy in" to the importance of promoting breastfeeding, negative personal breastfeeding experiences, use of personal anecdotes by the nurse instead of relying on current evidence, reliance on formula supplementation when time for promoting exclusive breastfeeding was limited, concern for the new mother's fatigue and frustrations levels, perceptions that breastfeeding promotion is not part of their role, and fear that they were encroaching on a mother's right to choose.

Although there have been attempts to improve the breastfeeding knowledge and attitudes of nurses working at clinics (Khoury, Hinton, Mitra, Carothers, & Foretich, 2002) and in neonatal intensive care units (Bernaix, Schmidt, Arrizola, Iovenilli, & Medina-Poeliniz, 2008; Spatz, 2005), few studies have been reported where programs have been specifically developed and tested for nurses working in in-hospital postpartum settings. One study conducted by Labarere et al. (2003) tested a 3-day

Margaret L. Beaman, PhD, RN, is a professor emeritus, School of Nursing, Southern Illinois University Edwardsville, Edwardsville, IL.

Cynthia A. Schmidt, PhD, RN, is a professor in the School of Nursing, Southern Illinois University Edwardsville, Edwardsville, IL.

Judith Komives Harris, EdD, ARNP, is co-owner of Rising Star Education Inc., Edmond, OK.

Linda Mitchell Miller, RN, Med, is co-owner of Rising Star Education Inc., Edmond, OK.

A lack of accurate facts can lead to a nurse's acceptance and endorsement of outdated hospital policies and practices known to negate positive breastfeeding outcomes.

training program for nurses, nurse-midwives, and physicians. The rate of exclusive breastfeeding at time of discharge increased from 15.8% to 35.2%, and the rate of any breastfeeding at time of discharge increased from 65.9% to 73.1%. This study however only measured mothers' perceptions of nursing support following the intervention, and not actual knowledge and attitudes of the nurses.

The goal of the current research was to test the effect of a self-paced, peer-led educational program on nurses' breastfeeding knowledge, attitudes, and beliefs, and their intentions toward providing support to breastfeeding mothers. The study was guided by the Ajzen and Fishbein's (1980) theory of reasoned action (TRA), which suggests that a person's attitudes and beliefs about a particular behavior are developed based on prior knowledge and experiences relative to the behavior, and their social pressures (subjective norms) to perform or not perform that behavior. These attitudes and beliefs are directly related to their intentions toward the behavior. The theory goes on to suggest that these intentions directly influence whether the person actually performs the behavior. For the current study the investigators hypothesized that an educational program promoted and guided by a peer (subjective norm) would improve breastfeeding knowledge and attitudes, and also promote a more unified approach among a hospital unit's nursing staff.

Based on the literature review and the theoretical framework, two null hypotheses guided this study: (a) The relationships among nurses' demographic and professional characteristics, preintervention breastfeeding knowledge, and preintervention attitudes, normative and behavioral beliefs, and subjective norms, and intentions toward the support of breastfeeding mothers are not significant and (b) compared to nurses who have no additional education on breastfeeding, nurses who complete the breastfeeding self-study modules will not have significantly higher breastfeeding knowledge, attitudes, beliefs, and subjective norms, and behavioral intentions to provide support to breastfeeding mothers.

Method

Design, Setting, and Participants

A quasi-experimental study employing a pretest/posttest design was used to address the research hypotheses. Following approval from the researchers' institutions, hospitals located in the Midwest and on the East Coast that had purchased the educational program tested in the current study were queried at the time of purchase for their interest in study participation. All hospitals who volunteered were included in the study; this resulted in a convenience sample of 13 hospitals. Maternal/newborn nursing staff from these hospitals were then asked to participate via in-hospital advertisement. The nurses were informed that their participation was voluntary and that their employer would be blinded to their involvement.

To determine a sufficient sample size for the study's planned bivariate and multivariate analyses, an a priori power analysis was performed using the G*Power program (Faul, Erdfelder, Lang, & Buchner, 2007). The multivariate analysis required a sample size of 179, with a power level of .80, an effect size of 0.25 and an α of .05. Classifying hospitals to the experimental and control groups was based on self-selection; because most of the hospitals wanted to begin the educational program immediately, there were only a few hospitals that agreed to serve as control groups. Therefore, nine hospitals served as the experimental sites and constituted 297 participants of the total sample, whereas the four control sites had 64 participants. One control site was unable to abide to the study protocol in its entirety and therefore was excluded, resulting in a final count of 12 participating sites. Comparisons of the pretest measures of the study variables between the hospital that did not complete the entire study and those who did were not significantly different. With an unbalanced design, a homogeneous sample is more important. Therefore, although the participating hospitals asked for participation from all of their health care employees who were involved in care of breastfeeding mothers, only the data from the 254 registered nurses (RNs) were analyzed. The final sample included 203 RNs from the experimental sites and 34 RNs from the control sites. Even with the homogeneous sample of only RNs, unequal group sizes required careful consideration in the statistical analysis.

Measures

To measure attitudes, beliefs about breastfeeding, and intentions to support women in their breastfeeding efforts, the research team used the 64-item Nursing Support for Breastfeeding

Table 1: Internal Consistency Reliability of Subscales and Breastfeeding Knowledge Test

Instruments/Subscales	Number of Items	<i>n</i>	α	Split-Half ^a
NSBQ				
Intention	3	247	.852	
Normative beliefs	4	189	.860	
Attitude	8	235	.720	
Behavioral belief	20	236	.870	
Evaluation, belief outcome	20	236	.926	
Behavioral beliefs—combined	20	247	.942	
Breastfeeding comprehensive knowledge test	50	237		.734

Note. ^aSpearman-Brown coefficient.

Questionnaire (NSBQ) (Bernaix, 2000) that measures the TRA constructs. The tool consists of six subscales, all formatted using a 7-point Likert-type scale: Attitudes (8 items); Subjective Norms (5 items); Motivation to Comply with Normative Beliefs (5 items); Behavioral Beliefs (20 items); Evaluation of Behavioral Beliefs (20 items); and Intention to encourage and support breastfeeding new mothers (3 items). As directed by the TRA, responses from related subscales were calculated to identify the four main subscale scores to be used in later analyses: Attitudes (possible range = 8-56), Behavioral Beliefs (possible range = 20-980), Subjective Norms (possible range = 4-196), and Intentions (possible range = 3-21). Prior use of this tool has revealed Cronbach's α coefficients ranging from .75 to .93 for the subscales (Bernaix). In the current study, subscales of the NBSQ demonstrated Cronbach's α s ranging from .72 to .94 (Table 1).

To measure knowledge about breastfeeding, the investigators used a 50-item Breastfeeding Comprehensive Knowledge Survey (BCKS) instrument developed by Harris and Miller (2005). Survey items measure basic and advanced breastfeeding knowledge and are presented in a multiple choice format. Content validity was established based on a review of literature and a consensus of 10 lactation consultants and a physician renowned for breastfeeding expertise. Although there are no prior psychometrics for this tool, internal consistency reliability for the BCKS in the current study was supported with a Spearman-Brown coefficient of .73 (Table 1). The Spearman-Brown coefficient is an appropriate reliability test when all of the items are dichotomous, that is, correct or incorrect (Garson, 2010b).

The Demographic Section of the survey assessed the individual's personal characteristics of age, gender, number of years of maternal/newborn nursing experience, and sources the nurses perceived as providing their current breastfeeding knowledge (nursing school, in-services, conferences, on-the-job training, personal experience, books).

Procedure

Upon study entry, all participants completed the Demographic Survey, the NSBQ, and the BCKS. The experimental groups then completed the intervention, a self-study module, over a span of 4 to 6 weeks. All participants completed the NSBQ and BCKS as post-tests after the experimental groups completed their intervention. Cross-pollination was highly unlikely because the experimental and control groups were located in different parts of the country. No significant differences in sample characteristics were noted between the experimental and control groups, and none of the pretest measures regarding breastfeeding differed between groups.

Intervention

The intervention was a guided, self-study involving 10 modules developed by two members of the research team (Harris & Miller, 2005). Module content includes topics such as assisting the new mother with breastfeeding initiation and maintenance, assessing breast milk production, basic breastfeeding technique, assessment and treatment of common breastfeeding complications, special maternal/infant breastfeeding needs, and pharmacokinetics of breastfeeding (Table 2). Inherent to this self-study program is an additional component of having peer trainers who facilitate

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the implementation of the modular program. As such, two members of the research team conducted training with two hospital representatives (RNs), identified by the unit's manager. The train-the-trainer seminars focused on an explanation of the educational program, the role of the trainer, how to implement the program, discussion and demonstration of the three "breastfeeding" skills in the program, presentation of adult education principles and group theory, requirements for continuing education credit, and how to facilitate the nursing staff's progress through the self-study and maintain the integrity of the study. The control hospitals received the same "train-the-trainer" session and distribution of the self-study module after completion of their NSBQ and BCKS pre- and posttests.

Data Analysis

Data entry and analysis was conducted using the 17.0 version of SPSS (2008). Analyses included descriptive statistics for sample characteristics, distribution of scores and psychometric evaluation of the study instruments, and selected inferential statistics to address the research hypotheses. A significance level of $p < .05$ was set.

Table 2: Content Outline of the Self-Study Module

Unit I	Program Purpose and Organization
Unit II	Introduction to Breastfeeding
Unit III	Assessing Breastmilk Production
Unit IV	Basic Techniques of Breastfeeding Competency Skill: Breastfeeding the Healthy Baby
Unit V	Maternal Difficulties of Breastfeeding
Unit VI	Difficulties with Breastfeeding Related to the Baby
Unit VII	Breastfeeding when the Mother has Special Needs
Unit VIII	Breastfeeding when the Baby has Special Needs Competency Skill: Alternative Feeding Methods
Unit IX	Drugs and Their Effects on Breastfeeding
Unit X	Sustaining Breastfeeding and Weaning from the Breasts Competency Skill: Expressing and Storing Breastmilk

Results

Sample Characteristics

The nurses in the current study ranged in age from 21 to 70 years, with a mean age of 42.6 ($SD = 10.6, n = 236$). Their maternal/newborn nursing experience ranged from fewer than 1 to 49 years, with a mean of 14.2 years ($SD = 10.8, n = 231$). Sources for obtaining breastfeeding education prior to the current study were varied across the sample. On average, nurses reported four different sources as contributors to their prestudy breastfeeding knowledge base ($SD = 1.9, n = 237$). In rank order, the sources were breastfeeding conferences, in-service education, on-the-job training, and continuing education workshops. The pretest breastfeeding knowledge scores ranged from 40% to 98%, with a mean of 65%. No significant differences were found between the experimental and control groups' personal or professional experiences, or their mean scores on the pretest measures of breastfeeding knowledge and the TRA constructs, thereby supporting the assumption of group equivalence (see Table 3).

Consideration of Hypothesis I

Pearson's r correlations performed on the recoded preintervention data revealed that age was significantly related to pretest breastfeeding knowledge ($r = .321, p < .001$), years of maternal/newborn clinical experience and amount of previous breastfeeding education were significantly related to pretest knowledge ($r = .321, p = .001$ and $r = .209, p = .001$, respectively), and years of maternal/newborn experience was significantly related to intentions to assist breastfeeding mothers ($r = .161, p = .007$). These relationships illustrate the obvious; essentially the older and more experienced the nurse is, the more knowledgeable they are about breastfeeding and the more they intend to provide breastfeeding assistance to their patients. Other significant correlations provided support for the relationships between TRA constructs. Pretest mean normative belief scores were significantly related to pretest attitudes ($r = .176, p = .004$), pretest behavioral beliefs ($r = .304, p < .001$), and intentions to assist breastfeeding mothers ($r = .181, p = .003$). Therefore the investigators rejected the first null hypothesis (see Table 4).

Consideration of Hypothesis II

Comparison of the pretest measures between the experimental and control groups yielded no significant differences. Posttest measures however were

Table 3: Characteristics of Final Nurse Sample, N = 237

Pretest Measure	Total Sample	Experimental Group ^a	Control Group ^a
	Mean (SD)	Mean (SD)	Mean (SD)
Age	42.56 (10.6)	42.71 (10.3)	41.6 (12.0)
Maternal/newborn years experience	14.23 (10.8)	14.66 (10.8)	11.73 (10.3)
Number of breastfeeding education sources	4.18 (1.9)	4.28 (1.9)	3.62 (1.5)
Mean normative belief score ^{b,c}	34.15 (11.4)	34.24 (11.3)	33.59 (11.8)
Knowledge ^{b,c}	31.66 (4.3)	31.85 (4.3)	30.53 (4.0)
Attitudes ^{b,c}	46.87 (6.1)	47.06 (6.0)	45.69 (6.2)
Behavioral beliefs ^{b,c}	714.16 (125.07)	714.51 (139.71)	653.48 (163.85)
Intentions ^{b,c}	18.94 (2.35)	19.02 (2.32)	18.52 (2.50)

Note. ^aExperimental group membership range $n = 189$ to 203 , control group membership range $n = 33$ to 34 .

^bRecoded scores to eliminate outliers.

^cAll group differences were not significant ($p > .05$).

significantly different: breastfeeding knowledge ($t = 10.99, p < .001$), attitudes ($t = 2.77, p = .006$), beliefs ($t = 2.58, p = .011$), and intentions ($t = 3.00, p = .003$). Further, the knowledge mean scores increased for the experimental group by 14% (64%-78%); for the control group, scores changed minimally from 61% to 62%. These differences suggest the educational intervention had a significant impact on the participants' knowledge about breastfeeding, attitudes, and beliefs about breastfeeding as well as intentions to assist new mothers with breastfeeding. The second null hypothesis was therefore rejected.

Predictors of Intentions

Multiple analysis of covariance (MANCOVA) analysis was conducted to determine the predictors of the posttest measures. MANCOVA measures the effect of the independent factor (education) and the

covariates (pretest measures) on the outcome measures (knowledge, attitudes, beliefs, and intentions). The pretest covariates serve as control variables for the independent factor (education), to reduce the error term in the model. Thus the effect of the education beyond the pretest measures is isolated.

The original data met one of the three assumptions of MANCOVA noted by Garson (2010a). The relationships between the dependent variables and the covariates were linear. Descriptive statistics revealed kurtosis of pretest intentions, posttest attitudes and intention scores were beyond the +2 to -2 range recommended for normal distributions. Because the control group was already small, dropping participants with outlier data was not an option. Therefore the outliers of each of the dependent variables (posttest measures) and the

Table 4: Pretest Correlations Among Nursing Support for Breastfeeding Questionnaire Subscales and Breastfeeding Knowledge Scores^a

	1	2	3	4
1. Intent score				
2. Attitude subscore	.403*			
3. Normative belief subscore Mean	.181*	.176*		
4. Behavioral belief subscore	.330*	.413*	.304*	
5. Breastfeeding knowledge	.175*	.079	-.017	.008

Note. ^aScores recoded to eliminate outliers, $N = 204$ to 222 .

* $p \leq .01$.

Table 5: Univariate Post-Hoc Analysis of Group Posttest Differences by Education and Pretest Covariate Measures

Posttest Measure	Grand Mean (SD)	Education Group Mean (SE) <i>n</i> = 165	Comparison Group Mean (SE) <i>n</i> = 27	Hotelling's Trace or Corrected Model (<i>F</i> , <i>df</i>)	Probability	Partial η^2
Knowledge	35.42 (.477)	39.18 (.356)	31.65 (.888)	.363 (20.57, 5)	< .001	.404
Attitudes	46.58 (.456)	47.22 (.341)	45.94 (.849)	.342 (26.77, 5)	< .001	.418
Beliefs	696.38 (11.53)	719.15 (8.61)	673.61 (21.47)	.344 (24.11, 5)	< .001	.393
Intentions	18.95 (.175)	19.38 (.130)	18.52 (.325)	.211 (20.57, 5)	< .001	.356

Note. Experimental group *n* = 165.
Control group *n* = 27.

covariates (pretest measures) were recoded to fall within 3 SD of the mean, a procedure known as winsorizing the data (Garson, 2009).

Following the recoding, the Box's test of equality of the covariance matrices of the dependent variables across groups was not significant ($M = 18.85$, $F[10, 9274] = 1.78$, $p = .059$). Levene's tests of equality of the error variances for all of the posttest measures were not significant with one degree of freedom (intentions: $F = 2.71$, $p = .101$; knowledge: $F = 1.73$, $p = .190$; attitudes: $F = .312$, $p = .577$; beliefs: $F = .024$, $p = .878$). Thus all of the assumptions of the MANCOVA statistic were met but may have increased the chance that the research hypotheses would be rejected.

The overall differences between the two groups was significant (exact $F[8, 370] = 28.98$, $p < .001$; Hotelling's Trace = 1.253; partial $\eta^2 = .385$, $p < .001$). Regarding the effect size, 38% of the variability in the dependent posttest knowledge, attitudes, beliefs, and intention scores was explained by the model that included the educational intervention, pretest intentions, and pretest knowledge, attitudes, and beliefs. Controlling for multiple comparisons using *F* statistics and Bonferroni-type comparisons, post-hoc univariate analysis revealed the experimental group had significantly more positive outcomes than the control group for intentions (mean difference = .749, $p = .041$), and knowledge (mean difference = 7.43, $p < .001$), but not for beliefs (mean difference = 20.96, $p = .385$) or attitudes (mean difference = .172, $p = .862$).

Univariate tests of between-subject main effects of the intervention on the outcome measures indicated a significant difference between the experimental and control groups on intentions ($F = 4.24$, $p < .041$), knowledge ($F = 53.36$, $p < .001$), beliefs ($F = .759$, $p < .385$), as well as attitudes

($F = .030$, $p < .862$; see Table 5). In summary, the education had the greatest effect on the posttest knowledge of participants and their intentions to provide breastfeeding support.

Discussion

Effective educational programs for improving maternal/newborn nurses' breastfeeding knowledge, attitudes, and supportive behaviors are needed to ensure accurate and consistent delivery of breastfeeding information and technical support to all mothers. Developing such a program is not an easy feat, however, as the program needs to be cost-effective, recognize differences in learning styles, and include strategies for effecting positive changes in practice. In the current study, the self-paced, peer-led learning module was effective in improving the sampled nurses' breastfeeding knowledge, attitudes, beliefs, and intentions toward providing support to new breastfeeding mothers. It is possible that this type of educational program may provide a less intimidating atmosphere for learning and promote retention of breastfeeding facts. Not having to sit in a classroom and remain attentive throughout a lengthy session, but rather studying the materials when it is convenient for the learner is likely to be a more favorable format. In addition, the peer leadership that is inherent to this program may provide the role modeling of positive breastfeeding attitudes and supportive behaviors (subjective norms) that will, according to the TRA, directly influence the nurses' intentions to provide accurate and helpful breastfeeding support to their patients.

Pretest scores for nurses in the experimental and control groups revealed overall moderately positive attitudes, beliefs, and intentions toward providing breastfeeding support; however, their breastfeeding knowledge was poor ($M = 65\%$). Nurses'

limited breastfeeding knowledge has been substantiated in other study findings (Bernaix 2000; Bernaix et al., 2008; Gagnon et al., 2005; Spear, 2004). This suggests that despite continued efforts to educate nurses about breastfeeding, knowledge deficits for some nurses still exist. This is concerning on two levels. First, new mothers may or may not receive the breastfeeding support they deserve and need from their individual nurse during the critical initiation phase of their breastfeeding experience. Whether the mother receives accurate and helpful breastfeeding support may merely depend on which nurse is assigned to care for the mother. Studies have indicated that women who experience problems with breastfeeding during the first week are more likely to discontinue breastfeeding by 10 weeks postpartum (DiGirolamo, Thompson, Martorell, Fein, & Grummer-Strawn, 2005). When one third of that first week is spent in the hospital, the need for nurses who are knowledgeable about breastfeeding becomes paramount.

Second, a lack of accurate facts can lead to a nurse's complacent acceptance and endorsement of hospital policies and practices known to negate positive breastfeeding outcomes. For instance, in-hospital formula supplementation provided to a healthy newborn is but one example of outdated practice that continues today as routine policy for some hospitals. Not only does this practice interfere with lactation physiology, but it is often perceived by the mother as an indication of a breastfeeding problem, and as such, the need for her to discontinue breastfeeding (Semenic et al., 2008). Staff nurses need to be knowledgeable of current breastfeeding facts so that they can question hospital policy and make evidence-based practice a more constant reality.

How to best prepare nurses to provide evidence-based breastfeeding support, however, has yet been determined. To date, hospitals and other agencies vary in the type and frequency of breastfeeding continuing education offerings they make available to their nursing staff. This inconsistency, along with the variations in nurses' personal and professional breastfeeding experiential backgrounds, has led to a professional network that is not always well prepared to be supportive of breastfeeding families. Educational interventions that will help ensure consistent, accurate, helpful, and responsive breastfeeding support by all nurses caring for breastfeeding mothers are needed. In addition, agency administrators need to demonstrate their commitment to this patient service by providing financial support for staff development and

mandating staff attendance to educational programs. New employee orientations and yearly competency renewals should include comprehensive breastfeeding education so that all nurses have the same knowledge base and skills. Programs, such as the one tested in the current study, may prove to be the answer as they are more affordable and feasible for settings that are limited in funds and staffing. Further, this type of educational program may be good for not only "on-the-job" training, but also for inclusion in nursing school curricula. Studies have already identified that including breastfeeding content in baccalaureate nursing programs improves students' breastfeeding attitudes and knowledge (Dodgson & Tarrant, 2007; Spear, 2006). Providing basic knowledge about breastfeeding to nursing students may help to instill a "felt need" and a foundation of facts so that they can be supportive to breastfeeding families, no matter what clinical setting they pursue after graduation.

Several study limitations prevent generalization of the findings. Convenience sampling of hospitals and allowing self-selection of hospitals into experimental and control groups may have resulted in a sample of hospitals and nurses with significant motivation and desire to improve their breastfeeding supportive practices. The broad geographic representation of the hospitals that participated and the lack of significant differences on pretest measures however help to counteract any sample bias. Further, because the hospitals were located in widely separated regions, cross-pollination and contamination between the experimental and control groups were unlikely. Another limitation was that actual nursing practice wasn't measured in the current study.

The TRA states that though positive intentions toward performing a particular behavior are likely to produce the actual behavior, it is not a certainty. So though the experimental groups did demonstrate gains in breastfeeding knowledge, attitudes, beliefs, and intentions, it is not known if the nurses were able to apply their new facts and skills at the bedside. Future research efforts should not only focus on replicating the current study with larger and more diverse samples, but also examine the intervention's effect on nurses' actual behaviors in providing helpful and accurate support to breastfeeding mothers and to see if those behaviors affect the mothers' breastfeeding success and satisfaction. In addition, the current study did not examine the sustainability of the outcomes. It is likely that intervention boosters would be needed

to maintain retention of facts and improved attitudes long term.

Nurses should be breastfeeding ambassadors to their patients. They must be prepared to provide accurate and helpful breastfeeding assistance whenever called upon to do so. Strategies designed to improve their abilities to provide breastfeeding support are needed. The educational intervention tested in the current study may address this need.

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